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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/589,149 | 06/08/2000 | Jurgen Schulz-Harder | A-7052 | 1064 |

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| EXAMINER | |
|---|---|
| RHEE, JANE J | |
| ART UNIT | PAPER NUMBER |
| 1772 | 7 |

DATE MAILED: 08/29/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

A9-7

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/589,149 | SCHULZ-HARDER, JURGEN | |
| | Examiner | Art Unit | |
| | Jane J Rhee | 1772 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) 30-53 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 30-53 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 30-53 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In independent claim 53, applicant illustrates the making of the ceramic/metal substrate wherein applicant claims "a ceramic layer forming at least two substrate areas connecting to each other as one piece and joining each other on at least one predetermined break line...the metal surfaces being formed by a metalization which had been bonded to the ceramic layer by a heat process ... edge reduction." The claims should positively set forth a series of the structure necessary for claiming the ceramic/metal substrate rather than mere statement of making the substrate.

### *Claim Rejections - 35 USC §103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 30-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schulz-Harder in view of Von Vajna. (5773764).

Schulz-Harder discloses a ceramic/metal substrate, comprising a ceramic layer having at least two substrate areas connected to each other as one piece and having at least one metal surface on at least one surface side of the ceramic layer and joining each other on at least one predetermined break line provided for in the ceramic layer (col. 1 lines 59-62) and wherein the metal surfaces on neighbored substrate areas are at a distance from another along at least one breaking line (col. 2 lines 20-27). Schulz-Harder discloses that at least one of the substrate areas comprise single substrates (col. 3 lines 1-3). Schulz-Harder discloses wherein at least one outer metal surface that is provided for on at least one surface of ceramic layer at least along one edge of the ceramic/metal substrate, and by at least one predetermined break line between the at least one outer metal surface and adjacent substrate areas (col. 3 lines 33-50). Schulz-Harder discloses that at least in an area of the single substrate on both surfaces of the ceramic layer at least one metal surface is provided for (col. 2 line 63-67 col.3 line 1) and that the at least one metal surface has, on a first surface area, on a bottom of the ceramic/metal substrate, an edge distance from the adjacent predetermined break line or its plane which edge distance is smaller that the edge distance of the metal surfaces on the second surface area, on a top of the ceramic/metal substrate (figure 1 number 4 and 3'). Schulz-Harder discloses that with several substrate areas or single substrates arranged in several rows, two groups of crossing predetermined break lines are formed (figure 1 number 4 and 3'). Schulz-Harder discloses that the metal substrates on at

least one surface area of the ceramic layer has no edge reduction on edges that are adjacent to a group of predetermined break lines (figure 2 number 2 and 3'). Schulz-Harder discloses wherein the single substrates formed by substrate areas are not provided with components (col. 2 lines 63-67 and col. 3 line1). Schulz-Harder discloses wherein the single substrates formed by substrates areas are provided with electric components (col. 1 lines 23-30).

Schulz-Harder fails to disclose that at least one metal surface of each substrate areas has at least one edge reduction on one edge adjacent to the predetermined break line and running along this predetermined break line and that the edge reduction is of a form that the mass of metal there per volume unite is reduced 10-80%, with reference to the specific metal mass of a metal surface outside of the edge reduction. Schulz-Harder fails to disclose that the edge reduction of the metal mass area is approximately 0.2 to 6mm. Schulz-Harder fails to disclose that the outer metal surface has an edge reduction along the predetermined break line. Schulz-Harder fails to disclose that the edge having the edge reduction has a distance from the adjacent predetermined break line or a plane of the predetermined break line that is considerable less than 1mm. Schulz-Harder fails to disclose that the edges with the edge reduction have a distance from the respective predetermined break line of approximately 0.05 to 1mm. Schulz-Harder fails to disclose that the textured or structured metalizations, or metal surfaces formed by these, have a thickness of between approximately 0.15 to 1mm. Schulz-Harder fails to disclose that the edge reduction is formed by beveling of the respective edge, the beveling forms an angel smaller than 45 degrees with a plane of the ceramic

layer. Schulz-Harder fails to disclose that the edge reduction is formed by hollows or depressions in a material of the metal surfaces. Schulz-Harder fails to disclose that the hollows or depressions are formed continuously, and extend to a surface side of the ceramic layer adjacent to the metal surface. Schulz-Harder fails to disclose that the hollows or depressions are formed in such a way that metal from the metal surface remains on the surface side of the ceramic layer adjacent to the metal surface. Schulz-Harder fails to disclose that the edge reduction is formed by a number of hole like depressions that are arranged as a row of holes. Schulz-Harder fails to disclose that the outer and inner depressions form an outer and a second inner row of holes. Schulz-Harder fails to disclose that the depressions have a diameter of approximately 0.5 to 0.6mm. Schulz-Harder fails to disclose the depressions forming a single row of holes have a diameter of 0.5mm, with a width of the edge reduction of approximately 0.8 mm and with a distance of the edge from the predetermined break line of approximately 0.5 mm. Schulz-Harder fails to disclose that the several rows of holes of the outer row of holes have a diameter that is larger than a diameter of the depressions of the inner row of holes, whereby the diameter of the depressions of the outer row of holes is approximately 0.6mm and the diameter of the depressions of the inner row of holes is approximately 0.4mm and the width of the edge reduction is approximately 1.4mm. Schulz-Harder fails to disclose that the edge reduction is formed by a groove-shaped depression. Schulz-Harder fails to disclose that the edge reduction is formed by a graduation of at least one partial area.

Von Vajna teaches a beveled edge reduction on a metal surface (figure 2 number 105 and 225) that is adjacent to the predetermined break line for the purpose of enabling rigid support for the circuit board portions prior to singulation (col. 3 lines 3-6). Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to have provided Schulz-Harder with a beveled edge reduction on a metal surface that is adjacent to the predetermined break line in order to enable rigid support for the circuit board portions prior to singulation (col. 3 lines 3-6) as taught by Von Vajna.

As to the edge reduction formed by hollows, depressions or a number of hole - like depressions, Von Vajna teaches a beveled edge reduction to enable rigid support for circuit board portions prior to singulation therefore, it would have been an obvious matter of design choice to have hollows, depressions, or a number of hole like depressions as edge reduction, since such a modification would have involved a mere change in the shape of a component. A change in shape is generally recognized as being within the level of ordinary skill in the art in absence of unexpected results. *In re Dailey*, 149 USPQ 47 (CCPA 1976). Applicant discloses that hollows, depressions, hole like depressions and beveled edges are various possibilities for forming edge reduction (pg 9 lines 11-35).

It would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to have hollows or depressions that are formed continuously, and extend to a surface side of the ceramic layer adjacent to the metal surface in such a way that the metal remains on the surface side since it is notoriously

known in the art that making hollows or depressions on a metal surface that the hollows or depression would extend to a certain extent to a surface side where the metal can still remain on the surface side if the hollows or depression weren't made too deep.

As to the mass of metal being reduced to 10 to 80% with reference to specific metal mass, the reduced metal mass area being approximately 0.2 to 6mm, edge reduction being approximately 0.8mm or 1.4mm, the distance from the adjacent predetermined break line or a plane of the predetermined break line being considerably less than 1mm or approximately 0.5 to 1mm, metal surface having a thickness of approximately 0.15 to 1mm, and the depressions having a diameter of approximately 0.4 to 0.6mm, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have presented these values since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art in absence of unexpected results. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

### *Response to Arguments*

Applicant's arguments with respect to claims 30-53 have been considered but are moot in view of the new ground(s) of rejection.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jane J Rhee whose telephone number is 703-605-4959. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon can be reached on 703-308-4251. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jane Rhee
August 26, 2002

HAROLD PYON
SUPERVISORY PATENT EXAMINER
1772

8/26/02